August 26, 2019
Status update

Matt Joyce
Custom Freezer

- Expected to ship end of next week.

- Specifications:
  - Capable of providing environmental temperature of -30°C
  - 2 beam ports (1” diameter)
  - 1 port for cabling (1” diameter)
  - 1 port for nitrogen line
  - 1 port for check valve
  - 19” x 17” x 6” space for bar/SiPM assemblies
DRS Evaluation Boards

- Received quote from PSI

Dear Mr. Matthew

We have the pleasure in quoting the following:

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Qty</th>
<th>Description</th>
<th>Price/pc</th>
<th>Total</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Evaluation Board DRS4 V5</td>
<td>USD</td>
<td>USD 2'700.00</td>
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<tr>
<td></td>
<td></td>
<td>Scientific Use Only</td>
<td>1'350.00</td>
<td>2'700.00</td>
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**Total** USD 2'700.00

**General Terms and Conditions:**

- This offer and the indicated price are only valid in accordance with the enclosed General Conditions of Sale of PSI. General terms and conditions of the contracting party are explicitly rejected.

**Order:**

- Please send your written order by email to drs4@psi.ch or by fax to +41 56 310 3120.
- The order has to mention the offer No. 2019/157 and the shipping and billing address.

**Prices:**

- Prices are exclusive value-added tax (VAT)

**Firm delivery:**

- 6 weeks ARO (After Receipt of Order)

**Delivery:**

- Delivery costs included according to INCOTERMS 2010, DAP place of purchaser
LYSO bars

- Shipping today -> should receive them by Thursday of this week

Dear Matt:

For your information, we have completed the fabrication of the LYSO bars as following.

(1), 6 LYSO bars with dimensions 3mm x 4mm x 57mm with all surfaces polished.

(2), 6 LYSO bars with dimensions 3mm x 3mm x 57 mm with all surfaces polished.

We will ship them out today to your place via FedEx 2nd day delivery.

Sincerely,

Bruce Chai
Irradiation of glues

- Making plot of transmission for each glue at 420nm vs dose
- Working on subtracting Fresnel reflection effects of glue/quartz interface -> $R = \left( \frac{n_1 - n_2}{n_1 + n_2} \right)^2$
- Need $n(\lambda)$ for the glues -> some data available from past ECAL tests (next slide)
Refractive index data (from ECAL tests)

- This data was taken from previous tests done by ECAL
Index of refraction data (RTV)

- RTV refractive index from ECAL

\[ \mu = \sqrt{1 + \frac{a^2 \lambda}{\lambda^2 - b^2} + \frac{c^2 \lambda}{\lambda^2 - d^2}} \]

- \( a = 12.79 \)
- \( b = 115.38 \)
- \( c = -11.92 \)
- \( d = -74.69 \)
Slides from previous update
Irradiation of glues

- Sandwiched both RTV and NOA between two 1mm-thick quartz tiles with a spacer
- Both glue layers ~1mm thick
Irradiation of glues

- Some results

![Induced absorption coefficient graphs](image)

- Induced absorption coefficient at 420 nm

<table>
<thead>
<tr>
<th>Glue</th>
<th>NOA 61</th>
<th>NOA + Quartz</th>
<th>RTV + Quartz</th>
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<tr>
<td>Integrated dose (kGy)</td>
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Relative light yield

- 3mm x 3mm x 50mm bars glued to S12 SiPMs (1 bar with RTV and 1 bar with NOA)
- IV curves show $V_{\text{br}}$ is within 0.1V for all 4 SiPMs used
- Using 4 boards supplied by Sergei Los (spelling)
- Na22 source positioned between LYSO bars
- Triggering on 4-way coincidence between all 4 SiPMs
- HDR2 bar used only for triggering purposes
- Same pair of boards used for measuring light yield of each bar to avoid effect of possible differences between boards.
- Tested a high gain amplifier and it looked good but I just need to make a picture of a pulse to show
- Still work in progress but should have some things to show soon.